## Remarks

The claims of the application have been substantially revised to take account of the Examiner's various grounds of rejection as set out in the office action. For convenience, summarized below is the status of the claims now presented to the Examiner for his consideration:

1. Claims deleted: 1, 4, 7, 9, 11, 13, 17, 20, 22 and 23;
2. Claims retained as filed: 8, 10, 15 and 19;
3. Claims amended: 2, 3, 5, 6, 12, 14, 16, 18 and 21;
4. New claims: 24-27.

Those claims objected to by the Examiner under 35 USC 112 as being indefinite and which have not been deleted on this occasion have been amended in a manner believed to address the matters formally raised by the Examiner.

With regard to the Examiner's various grounds of rejection under 35 USC §102 and 35 USC §103, all of the independent claims remaining in the application have been amended to incorporate the subject matter of claim 2 (as also amended) to the effect that the present invention relates to a passive optical coupler in which each input port of the coupler is coupled to all output ports of the coupler other than an output port forming a port pair with said input port such that a signal received by an input port of the coupler is broadcast to all the output ports save for that output port with which said input port forms a pair. The

advantage that this arrangement provides over prior art systems will become apparent from the following.

Given that all independent claims remaining in the application are now directed to a passive optical coupler as aforementioned or to systems incorporating such a coupler, all substantive grounds of rejection save for those relating to Kavehrad et al (US 4,701,909) and Ota (US 5,854,700) are moot and it is only necessary here then to consider the relevance of Kavehrad and Ota.

In section 7 of the office action, the Examiner has contended that Kavehrad teaches a passive optical coupler 12 in which each input port 15 is coupled to all output ports other than its corresponding output port. The Examiner seeks support for this view from Kavehrad, column 3, lines 12-25. The applicants submit that a proper consideration of this part of the teaching of Kavehrad merely confirms that the star coupler 12 has a conventional arrangement of connections between its input and output ports as is clear from the passage at column 3, lines 22-25 in which it is stated that the lightwave signals from all transceivers of the LAN are received by star coupler 12 and distributed to all output ports and the associated output fibres 16 for delivery back to the transceivers 11 of the LAN. This confirms that an optical signal received from a transceiver of the LAN at an input port of the star coupler is broadcast to all output ports of the coupler and is thus communicated to all transceivers of the LAN including that transceiver which emitted it. There is nothing in the teaching of Kavehrad that suggests that the star coupler 12 has anything other than a conventional input/output port connection arrangement.

The Examiner has made a similar contention with respect to Ota and the applicants are able to rebut this in a similar manner as above. Reference to column 2, lines 3-5 of Ota make it clear that, in the communication network, a signal transmitted from one node is transmitted to all of the nodes, viz the network has a broadcasting function. Relating this back to the star coupler 25 which is of the mixing rod type, it confirms that a light signal received at an input to the star coupler is communicated to all outputs including the output corresponding to said input on which the signal is received which is once again a conventional arrangement in contrast with the present invention.

In the arrangement of the present invention, when a given subscriber station (transceiver) has information to transmit, the station receiver monitors its incoming fibre (input) for optical activity from other outstations and, if no such activity is present, the station is able to start transmission. In this respect, the arrangement of the present invention is similar to that of Kavehrad and Ota.

In the arrangement of the present invention, during a transmission, a subscriber station receiver monitors the incoming connection for signal activity indicative of a collision. If a collision is detected, the station ceases transmission and retries after a random time interval. Yet again, this is similar to the arrangements of Kavehrad and Ota. However, the present invention has the advantage over the arrangements of Kavehrad and Ota in that, since a node's own transmitted optical signal is not returned by the coupler, any activity at that node's receiver can only result from transmissions from another node on the network. Thus, if a subscriber node detects optical activity while it is transmitting, then a collision must have occurred. This contrasts with the arrangements of Kavehrad and Ota in which, when a node is transmitting, its signal is returned to it by the coupler and thus, when seeking to detect a

collision, it must detect optical activity of other nodes over and above its own return signal. It is therefore necessary in the arrangements of Kavehrad and Ota to provide means able to discriminate the node's own signal returned to it by the coupler from other signals which would be indicative of a collision. In the present invention the detection of any activity on a node's incoming connection is indicative of a collision since that signal can only have resulted from activity by another node. Consequently, in the present invention the means for detecting such other node activity can be a device having a low frequency response such as a pin diode thus simplifying such means and increasing the reliability that a collision would indeed be detected.

It is respectfully submitted that there is nothing in the teaching of Kavehrad or Ota, either singularly or in combination, which would guide a skilled person to the arrangement of the present invention nor indeed motivate him to modify said prior art arrangements to arrive at that of the present invention. Each of Kavehrad and Ota employ a star coupler having a conventional input/output connection arrangement and each of these prior art citations is directed to solving technical problems not related to the form of connections that exist between said inputs and outputs of the star coupler.

Favorable reconsideration of this application is therefore requested.

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## Version With Markings To Show Changes Made

2. (Amended) A passive optical coupler comprising:

a plurality of [input] port[s] pairs, each port pair comprising an input port and [having] a corresponding output port;

wherein each input port is coupled to all output ports other than its corresponding output port.

3. (Amended) A communications access network comprising a passive optical coupler [according to claim 1] comprising a plurality of port pairs, each port pair comprising an input port and a corresponding output port;

wherein each input port is coupled to all output ports other than its corresponding output port.

5. (Amended) A passive optical network arrangement comprising:

a head-end station;

a plurality of [at least one] subscriber stations;

a passive optical network providing optical connectivity from each of said stations to each other station;

wherein each of said plurality of subscriber stations [are] is arranged to transmit on a common optical [frequency] wavelength $\lambda 1$ distinct from [that] the wavelength $\lambda 2$ on which said head-end station is arranged to transmit, and each of said plurality of subscriber stations is arranged to detect when another of said subscriber stations is transmitting on said common optical [frequency] wavelength $\lambda 1$ over said passive optical network, and in which the passive optical network comprises a passive optical coupler [according to claim 1] comprising a plurality of port pairs, each port pair comprising an input port and a corresponding output port;

wherein each input port is coupled to all output ports other than its corresponding output port.

6. (Amended) A passive optical network arrangement according to claim 5 in which [the] each of the plurality of subscriber stations communicates with the head-end station using a carrier sense/collision detection protocol.

12. (Amended) A telecommunications access network comprising a passive optical network arrangement [according to claim 5] including a passive optical coupler comprising a plurality of port pairs, each port pair comprising an input port and a corresponding output port; wherein each input port is coupled to all output ports other than its corresponding output port.

14. (Amended) An optical transceiver arrangement for a passive optical network arrangement including a passive optical coupler comprising a plurality of port pairs, each port pair comprising an input port and a corresponding output port;
wherein each input port is coupled to all output ports other than its corresponding output port, said transceiver arrangement comprising:

a transmitter arranged to transmit data on a first optical frequency;

a transmission detector arranged to receive, on said first optical frequency, signals from a network indicative of a transmission by another subscriber station on said first frequency;

a medium access logic unit arranged to prevent transmission on said first frequency while said transmission detector is detecting said signals from a network indicative of a transmission by another subscriber station on said first frequency .

16. (Amended) An optical transceiver arrangement according to claim [14] 15 in which the station comprises:

a common input port arranged to receive both said data transmitted on a first optical frequency [signal on said first optical frequency] and said data on a [signal on said] second optical frequency;

an optical frequency splitter arranged to provide said [signal] data transmitted on [said] a first optical frequency to said transmission detector and said [signal] data on [said] a second optical frequency to said receiver.

18. (Amended) An optical transceiver arrangement according to claim [17] 14 in which the transmission detector comprises a simple light detector.

21. (Amended) A method of operating a passive optical network arrangement comprising:

a head-end station;

[at least one] a plurality of subscriber stations;

a passive optical network providing optical connectivity from each of said stations to each other station;

the method comprising the steps of:

at one of said plurality of [least on of the] subscriber stations transmitting a signal on an optical frequency common to [the] said subscriber stations and distinct from that on which said head-end station is arranged to transmit[;], said signal being transmitted to a passive optical coupler comprising an input port and a corresponding output port; wherein each input port is coupled to all output ports other than its corresponding output port; and

at [least one of the] one of said plurality of subscriber stations detecting when another of said subscriber stations is transmitting on said common optical frequency over said passive optical network.